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## LOCAL PROGRAM AND WATER MANAGEMENT FOCAL POINTS OF THE SUSTAINABLE DEVELOPMENT

Dóra VIMOLA

VITUKI Innosystem Ltd.  
Budapest, 1095 Kvassay J. st. 1., Hungary  
Department of Environmental Economics  
Budapest University of Technology and Economics  
H-1521 Budapest, Hungary

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### Abstract

The local program of the sustainable development (Local Agenda 21 – LA 21) targets to create harmony in the nature–economy–society triangle, in a way to support the long-term goals of sustainability. We have examined the structure and preparation period of action programs elaborated by the municipalities, emphasising the water management component.

*Keywords:* Local Agenda 21, sustainable development, indicators, water management.

### 1. Introduction

At the beginning of the 21st century, people feeling responsibility for the future believe the idea that organising the co-operative system of economy, society and nature reasonable from the aspect of satisfying current requirements should not jeopardize the prospect of further generations.

The main drivers of our existing global world are profit and GDP growth. Hence, there are only attempts to accomplish the ‘sustainable development’ on different levels, such as global, regional or local one. Since the European Union, getting over its 5th environmental action plan, considers, although there were useful results throughout the action plans, but the breakthrough of the sustainability theory is not achieved yet.

Achievements in the local programs are to be mentioned amongst the partial successes. The global and long-term principles of the sustainable development emerge on these local levels.

The local program of the sustainable development (Local Agenda 21 – LA 21) targets to create harmony in the nature–economy–society triangle in a way to support the long-term goals of sustainability.

## 2. Bases of Local Agenda 21

Local Agenda 21 is a complex program of building and operating systems, which keeps the exchange of the natural capital to economic one feasible only in a way complying with the requirements of the biosphere.

Environmental sustainability means preserving the capital of the nature. This requires that the use of renewable resources, water and energy sources should not exceed the limit where the natural systems rebuild themselves. Another requirement is that the use of non-renewable resources should not exceed the limit while those are replaced by renewing resources. Environmental sustainability includes the theory that the quantity of emissioned pollutants should not exceed the limit that the air, water and soil are able to absorb and process. Furthermore, environmental sustainability implies the protection of biodiversity: human health, air, water and soil quality, which is sufficient to preserve human life and welfare as well as the protection of flora and fauna forever.

As it is well known, Agenda 21, Article 28 on initiative of local authorities for the support of Agenda 21, accepted in Rio, dealing with the local program of the sustainable development, focuses on the key role of municipalities.

As the problems and solutions detailed in Agenda 21 derive mainly from local activities, the participation and co-operation of local authorities are determining factors during the implementation period. These authorities have multiple roles in the process: they build and maintain the economic, social and environmental infrastructure, control the design processes, create local environmental policy and regulations, as well as contribute to the implementation of national and lower level environmental policy. Since the local government has direct connection to people, it has a fundamental role in their education, mobilisation and susceptibility in order to support sustainable development.

All municipalities have to initiate dialogue with the inhabitants, local organisations and private enterprises, and then accept a 'local Agenda 21'. During discussions and common agreements, the local authorities learn the unique initiatives of citizens, local, civil, social, business and industrial organisations, as well as get the necessary information to form the best strategies. As a result of the discussions the proprietary consciousness would increase in the different fields of sustainable development. It is important to measure, analyse and amend the programs, policy, laws and regulations of the local authorities in order to achieve the goals of Agenda 21 in line with the approved local programs. These strategies would be usable to gain financial support on local, national, regional and international levels.

Hence, the local program of sustainability should comprise the following:

**Ecological standpoint:** to guarantee the long-term welfare of inhabitants, as well as the variability and life circumstances of flora and fauna, through protection of local environment and efficient usage of the natural resources.

**Economic standpoint:** to rely on the human resources, renewable resources and the economic formations optimal from the point of view of the national economy.

**Social standpoint:** to agree on the basic values, healthy circumstances of life, and to ensure the necessary circumstances for the current and future generations.

### 3. Forming the Local Agenda

The implementation of Local Agenda 21 does not have any strict run, but there is a suggested execution algorithm depending on time and place. According to the experience gained from Hungarian pilot projects, the following structure seems to be applicable:

- *Developing partnerships, forming associations.* In the case of local municipalities or micro-regions the first step is to reason the municipalities or municipal associations into forming these kinds of associations. The municipalities have an essential role in the preparation and implementation of the local programs due to the following reasons:
  - Municipalities are situated on that level of administration where things really happen. National conventions and central policy have the power of concluding widespread agreements, but these agreements always lead up to local level processes.
  - They are closer to local communities, it is easier to contact them than by the central government or the international organisations. Hence they are more sensitive for local problems.
  - In several cases they have some degree of freedom in economic decisions.
  - They constitute official and structured connections among local community, central government and the inhabitants of neighbouring settlements.

Winning the elected representatives of the municipality and the concerned members of the municipal bureaucracy (this means municipal commitment) supposes the widespread information of colleagues about objectives, philosophy and education of these people in order to increase consciousness.

Local Agenda 21 is not only a set of documents and plans, but a system of partnership and community for co-operation, which determines objectives, creates programs and operates them self-supporting on the long-term run, improves the system continuously, thus selection of partners and formation of operating organisations are key success factors.

Potential partners vary with different local communities as they depend on several factors (e.g. economic and social state of development, traditions, ethnic groups, religions).

- *Problem oriented status assessment, system solution.* As the partnership system of Local Agenda 21 has been organised, the association should start

the work with exploration of problems as first step. Subjective and objective analyses are performed simultaneously in this period.

Subjective status assessment and problem exploration inform about the local community's opinion on local status and major problems. With the help of this kind of information, it is useful to prepare a pre-SWOT analysis that can be amended later.

Objective study means that problem exploration and status assessment are made through expert analyses and by scientific research. In this phase the selection of ecological indicators can be started.

- *Selection of community priorities, setting objectives.* Setting objectives precedes program preparation. It is very important to define priority. Setting objectives is a very complex work, as these objectives should:
  - be achievable,
  - be exact and measurable,
  - contain the length of implementation period,
  - be supported by inhabitants.

Setting of interim objectives has a major importance, what is shown by the indicators presented in the scheme. Objectives should be accepted by the local elected bodies, since among the objectives it is possible to have political ones.

- *Action planning, preparation of programs.* Preparation and implementation action plans are central parts of the sustainability development designing process. These strategic plans discuss problems in system approach and they have long-term perspectives. These plans are mobilising local human resources and make synergy with the involvement of influenced people. The action plan sets objectives for short and long run as well, and determines the possible options and evaluation mechanism to achieve these goals.
- *Implementation and monitoring.* First precondition for successful implementation of strategic action plan is the appliance of organisational structure, created in the design period, in the implementation phase. During implementation, the participants should have well defined tasks. We can consider as second pre-condition that the plan should be integrated into municipal practice.
- *Evaluation and feedback.* Progress towards sustainable development requires the systematic evaluation of the strategies laid down in the plan. The interested parties, the municipality and the inhabitants should control regularly the effects of the implementation, and if the effect is not the same what was indicated in the plan, plans should be revised. Periodic progress evaluation and community feed-back are important pre-conditions of the success of Local Agenda 21. First and basic feature of a good feed-back system is providing appropriate information to appropriate

target group. The most important aims of information supply are to inform inhabitants about

- actual situations and
- preferred forms of attitudes and actions.

The effect of information depends mainly on information provider (e.g. municipality, experts, enterprises), distributor (e.g. neighbour, organisations, mayor's office) and supporting (e.g. personal meeting, printed material, radio). We can summarise in general that the confidentiality, authenticity and accessibility of information sources should be optimised during the system planning period. Information may strengthen commitment of people, but this is just one element of the successful feed-back system. The second important part of this system is the application of motivating means as awards and punishments.

#### **4. Role of Indicators in Local Programs of Sustainable Development**

Local indicators of sustainability are accepted by local community as evaluation criteria of the changes (ICLEI, 1996).

An important element of the program preparation described above is the measurability of the objectives and provisions formulated in the scenario and the level and dynamics of implementation. This has three objectives:

- On one hand, it is necessary to have feed-back on the propriety of the provisions listed in Local Agenda 21,
- On the other hand, based on the evaluation of the indicators providing feed-back continuously, there is a possibility to amend the improper program parts in due time,
- The utilisation and effectiveness of the invested financial sources can be measured.

The steps for creating final indicator list applied for the exact municipal Local Agenda 21 are the following:

- Examination of the data available for the project, and what kind of data collection is possible within the given budget,
- Determination of the strategic objectives of the designed program,
- Creating the structure of the indicator system, detailing the dimensions and the sub-systems of the dimensions (e.g. healthcare, income, education, family, free-time activities within social dimension),
- Determining the indicators that can be calculated based on the data available,
- Selecting and listing key indicators.

## 5. Water Management as Key Factor for the Sustainable Development

It is necessary to examine all the natural components during elaboration of the Action Program detailed above. These are always the local circumstances that determine the most important components – and those of requiring quick intervention – in the case of a settlement, it is not possible to determine preliminary sequence among environmental components.

We can take for certain that some basic functions of water management will have key importance in the Action program.

Ecology, economy and society form together the basis of sustainable development and all these elements have connections with water. Natural surface and groundwaters are parts of the environment and are jeopardised by human activities. Natural waters are heavily polluted in many cases nowadays, and protection is inevitable from the standpoint of natural resources, and in order to ensure human life circumstances.

As already mentioned water forms considerable economic potential in several respects, and has the special aspect that, on one hand, water is a renewable energy resource (e.g. water energy, and, on the other hand, it is non-renewable or needs long regeneration period (e.g. polluted aquifers). Furthermore, water may form basis of different economic activities, (e.g. necessary irrigation in plant cultivation, shipping).

Social role of water can be important as well. It has vital importance, and represent considerable tourist attraction (e.g. thermal water, spa).

It follows from the foregoing that water protection is a basic component of sustainable development. As a consequence of the complex feature of this element, water should be emphasised during the preparation and management of local action programs.

### *5.1. Water in the Preparation of Municipal Local Agenda 21*

Creating partnerships and forming associations have crucial importance from the point of view of water management, as there are municipalities where drinking water and wastewater treatment providers are isolated from the municipality. In these cases municipal management does not take care of drinking water protection.

The most upsetting situation was when the mayor of a settlement allowed establishing a waste landfill in the neighbourhood of a water resource (outer protection area), and he did not pay attention to the fact that he jeopardised the drinking water resources of his own municipality.

These associations have significant importance in many cases, as the decision making municipal leaders usually do not have technical qualifications. They do not have the most important environmental knowledge, they decide only according to the temporary economic situation.

Municipal leaders usually do not consider that e.g. establishing an environmentally hazardous industrial plant near to the drinking water resources can bring profit to the settlement on the short run, but with the pollution of aquifers the municipality should invest much more money into water treatment or substitution.

Associations with adequate members could ensure all the available information to decision makers, so they could come to decision with respect to long-term objectives. This method promotes sustainable development as well.

Based on our experiments, in the case of Hungarian settlements it is worth considering the following issues in the as – is analysis:

- Water supply – water sources, the quality and quantity of provided drinking water, how water resources can satisfy the consumption in the long run, local drinking water consumption habits and how the domestic and industrial consumption can be reduced, factors jeopardising the safety of drinking water resources and how it can be avoided.
- Wastewater treatment – proportion of the settlement provided by sewer system, the number and ratio of connections to the sewer system and how this proportion can be increased, combined/separated feature of the system, the efficiency of the wastewater treatment, what kind of complementary actions are necessary to the treatment plant according to the EU regulations, expected changes concerning wastewater quality and quantity, most significant industrial loads, positive effects of the pre-treatment technologies, the effect of the treated wastewater load to the receiver.
- Surface waters – surface water connections of the settlement, quality, utilisation, and utilisation perspectives of the given surface water, pollution loads to the surface waters and options for reducing the hazardous effects of the loads, possibility of floods, cost-benefit analysis on the degree of risk.
- Groundwater – typical kinds of soil and groundwater quality and quantity, the utilisation, the degree of danger and possible protection methods.
- Layer, karstic, thermal and medicinal waters – quality, quantity utilisation, utilisation perspectives, degree of danger and possible protection methods.

It has crucial importance to know the opinion of inhabitants about the given situation, how much information they have concerning water management questions, which local organisations take part in the management. We have to note that inhabitants of our country unfortunately are not duly informed in water management questions. As they do not face with basic problems, they do not know the price of tap water and wastewater treatment. They do not really appreciate that rivers do not jeopardise their place of residences and do not have information about how much it costs to keep their recreation capability.

Priority list, objectives and other environmental problems can be determined based on the information of the status evaluation. According to our experience,



there is no general applicable form for the settlements of our country due to their variable geographical features.

The success of action program or the feed-back on occurring problems and adequate communication channels may create the marketing of local water management. These kinds of marketing activities have not been emphasised so far in our country, due to the lack of knowledge and financial background.

Though, we can make huge steps towards environmental protection by providing fundamental information to affected inhabitants. These communications should be more and more spectacular. Last year in Austria we have seen that in frame of these actions an artificial creek model was installed on the main square of the settlement, and furthermore an exhibition presented the nature and the technical-economic questions and problems to the inhabitants.

Costs of the action most likely will not exceed the ones of developing and distributing a simple informative publication, not even the costs of remedying environmental damages. Surprisingly, their content reaches the required audience.

### *5.2. Proposed Indicators for Water Management Action Plans*

It is useful to consider the following indicators before the elaboration of the indicator system of a water management action plan. In unique cases further indicators can be considered as well, and we may apply just the most important points of the following list.

- In the case of municipal water resources the produced water quantity and its proportion to maximum water quantity
- Proportion of produced water quantity to water demand of the settlement
- Produced water quality
- Cost of water production (cost/m<sup>3</sup>)
- Proportion of areas supplied by drinking water system
- Water consumption (absolute quantity, quantity/capita)
- Quality of drinking water
- Water quantity used by major industrial consumers
- Cost of drinking water at the municipality
- Proportion of areas with sewerage system
- Proportion of inhabitants using sewerage system
- Proportion of combined and separated sewerage system
- Proportion of treated wastewater
- Efficiency of the treatment (water quality before and after treatment)
- Deviations from threshold limits specified by the European Union
- Cost of wastewater treatment
- Sewer fee in a given municipality



- The effect of treated wastewater to the recipient (using some main components)
- Status of natural waters (eutrophication, algae process, organic material content)
- Quality of surface waters (chemical and microbiological aspects)
- Estimated number of surface water users
- Cost of the restoration of flood damages
- Cost of flood prevention
- Proportion of surface water runoff to the discharges
- Variation of groundwater level
- Quality of groundwater
- Pollution concentrations and volumes polluted potentially
- Used groundwater quantity
- Quantity of available layer waters, thermal waters and mineral waters
- Quantity of used layer waters, thermal waters and mineral waters
- Number of inhabitants affected by the utilisation
- Cost of production and utilisation
- Costs spent for the sustainable development of water management elements

## 6. Conclusion

In the globalised world of today, several actions were initiated to accomplish the 'sustainable development', amongst them the achievements of local programs seem to be the most successful ones. Since, the global, long-term theory of sustainable development starts to emerge on the local program level.

The local program of the sustainable development (Local Agenda 21 ) targets to create harmony in the nature–economy–society triangle, in a way to support the long-term goals of sustainability. We have examined the structure and preparation period of action programs elaborated by the municipalities, emphasising their water management component.

Since the problems and solutions detailed in Agenda 21 derive mainly from local activities, the participation and co-operation of local authorities are the determining factors during the implementation period. Each municipality has to start dialogue with the inhabitants, local organisations and private enterprises, and then have a 'Local Agenda 21' accepted.

The implementation of Local Agenda 21 does not have a strict run, but there is a suggested execution algorithm depending on time and place.

An important element of the program preparation is the measurability of the objectives and provisions formulated in the scenario and the level and dynamics of implementation.

It follows from the foregoing that water protection is a basic component of sustainable development. As a consequence of the complex feature of this element,

water should be emphasised during the preparation and management of local action programs.

Four areas of water management in Hungary were analysed: drinking water supply, wastewater treatment, surface and ground waters. Special elements of the above groups were reviewed and proposals for the measurement indicators were provided.

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